From: Eckley.Chris@epamail.epa.gov
To: Jen.Mark@epamail.epa.gov
Date: 1/31/2013 5:31:16 PM
Subject: Eckley Scoping comments on Donlin
Attachments: Eckley Donlin Gold Scoping 2013_01_30.docx

Hi Mark,

Attached are my scoping comments for Donlin Gold project *(See attached file: Eckley Donlin Gold Scoping 2013_01_30.docx)*

--Chris

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Donlin Gold Scoping Comments—Eckley

Nonpoint source emissions of mercury.

- It has been shown in numerous studies that mercury (Hg) associated with solid material or dissolved in an aqueous solution can volatize directly to the atmosphere. Often only a relatively small percent of the solid/liquid associated Hg volatizes; however if the solid or solution concentrations are high (as they often are at mines in geologically enriched Hg areas) and/or cover a large surface area (also often the case at major mine operations), then there is potential for significant amounts of mercury to be released from nonpoint sources. Limited amounts of data are available on these releases from mines, but previous studies from Nevada gold mine areas indicate that surface volatilization can range from 10 to over 100 kg/year per mine—depending on many different mine characteristics (study details available upon request).

  In order to have a full understanding of Hg releases from a mine operation, these nonpoint sources will need to be quantified. Prior to the development of the mine, these emissions can be estimated based on anticipated Hg concentrations of the different mine surfaces. These estimates should be included in an EIS.

  Surface-air fluxes are not unique to mining areas.; they can also occur from natural landscapes—with landscapes containing geologically enriched Hg having larger emissions. To help contextualize the emissions from a proposed mine, there may be utility in first quantifying the baseline Hg emissions from the natural landscape.

- Apart from volatilization, particulate bound Hg can be mobilized through wind erosion, which may be deposited locally. The potential for wind erosion of Hg enriched particles should be discussed. The potential for this Hg to be deposited to local wetlands and methylated should be discussed.

Point source mercury emissions to the atmosphere.

- State of the art Hg abatement systems are proposed for the mill, with Hg removed from the gas stream via activated carbon. How efficient is this Hg capture system expected to be and what is the expected magnitude of Hg releases from the mill exhaust stack? In addition information on the speciation of this Hg is important to identify if releases will be deposited locally or enter the global pool.

Mercury methylation

- The impact of Hg on aquatic systems is dependent on the amount that is methylated. Mercury methylation requires—inorganic Hg and methylating bacteria. The predominate (though not exclusive) methylators of Hg are sulfate reducing bacteria (SRB). SRB require -- anoxic conditions, sulfate, and an organic carbon source. Therefore, any landscape alterations that affect the activity

of SRB can have a large effect on methylmercury (MeHg) concentrations in aquatic biota. As such, in evaluating the impacts of the proposed mine, it is not adequate to look at just releases of inorganic Hg. While this is important, information on how the mining activity influences the methylation potential of mercury must also be included.

- In 2007, measurements of MeHg were added to the Hg baseline study. These measurements focused on stream/river sediments. While measuring sediments may have the benefit of being less temporally variable than water; the water measurements may more representative of the MeHg available for accumulation in the foodweb. It is likely that Hg methylation in the area is mainly occurring in wetlands. The export of MeHg from these wetlands is likely in the dissolved phase. Therefore, it may be the case that sediment MeHg concentrations are not representative of water MeHg concentrations. The export of MeHg from wetlands is likely highly temporally variable and would be dependent on hydrological connectivity between the wetlands and streams. Therefore, perhaps the most efficient way to identify the baseline methylation potential of the ecosystem is to collect measurements directly from the wetlands.

- Numerous studies have shown that MeHg concentrations in water have large seasonal variability—with the highest concentrations in the late summer/early fall. Over the winter MeHg typically decreases, resulting in lower springtime concentrations. As such, to understand the maximum amount of MeHg being produced, measurements would need to be made in the late summer or early fall.

- The EIS should acknowledge the potential for methylation to occur downstream from the mine site and the role that export of DOC, sulfate, and inorganic Hg may have on facilitating downstream methylation.

Cumulative Impacts

- Releases of Hg or MeHg associated with the mine need to be contextualized with the releases from Red Devil mine upstream to understand any cumulative impacts of releases.